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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/700,656
Filing Date: February 14, 2001
Appellant(s): VATER ET AL.

Benjamin E. Urcia
(Reg. No. 33,805)
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 19 April 2011 appealing from the Office action mailed 20 January 2011.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 26-33 and 42.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal, except to note that the Kocher publication is referred to by the incorrect publication number (the correct publication number is set forth below in section 8, Evidence Relied Upon). Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being

maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

2002/0124178	KOCHER et al	9-2002
5,655,023	CORDERY et al	8-1997

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 26-33 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kocher et al, US Patent Application Publication 2002/0124178, in view of Cordery et al, US Patent 5655023.

In reference to Claim 26, Kocher discloses a method of protecting secret data stored in a semiconductor chip of a data carrier, where the method includes falsifying input data by combination with auxiliary data before execution of one or more operations and executing those operations on the semiconductor chip (paragraphs 0068, 0070, and 0072, where blinding occurs before permutation operations), and combining the output data with an auxiliary function value in order to compensate for the falsification of the input data (paragraphs 0070, 0072, and 0073, where unblinding occurs to compensate for the blinding), where the auxiliary value was determined by

executing the operations using the auxiliary data as input data (paragraph 0072, where the output buffer is initialized with the blinding bit and the data in the output buffer is the result of using the input permutation table, i.e. the operations). However, while Kocher discloses previously determining the auxiliary data and/or values (see paragraph 0072), Kocher does not explicitly disclose determining the auxiliary value previously and in safe surroundings.

Cordery discloses a method in which secret function values are pre-computed in safe surroundings and where the secret values are maintained securely, i.e. stored in the memory of a semiconductor chip of a data carrier, and then later retrieved for use (see column 3, lines 18-25, where tokens are pre-computed, see also column 5, lines 10-12, where tokens include encrypted data, and column 3, lines 11-13, where the encryption algorithm and keys are protected; see also column 4, lines 52-59, where the tokens are stored on smart cards and protected against tampering, i.e. maintained securely). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Kocher to include pre-computation and safe storage of secret function values in order to protect the encryption algorithm and secret key used (see Cordery, column 3, lines 11-13).

In reference to Claim 27, Kocher and Cordery further disclose that the combination with the auxiliary function value is performed before execution of a non-linear operation (see Kocher, paragraph 0074, where inputs can be maintained in a blinded state and only reconstituted when nonlinear operations must be performed).

In reference to Claim 28, Kocher and Cordery further disclose that the auxiliary data are varied and function values are stored in the memory of the data carrier (Kocher, paragraphs 0072-0075; Cordery, column 4, lines 54-58).

In reference to Claims 29-32, Kocher and Cordery further disclose that new auxiliary values can be generated by combining existing values, that auxiliary data are selected randomly, pairs of auxiliary data and auxiliary function values are generated, and the auxiliary data are random numbers (see Kocher, paragraphs 0072 and 0075).

In reference to Claim 33, Kocher and Cordery further disclose combining the output data and auxiliary function value using an XOR operation (see Kocher, paragraph 0073).

In reference to Claim 42, Kocher and Cordery further disclose that operations include permutations of data (see Kocher, paragraphs 0068 and 0070-0074).

(10) Response to Argument

Regarding the rejection of Claims 26-33 and 42 under 35 U.S.C. 103(a) as unpatentable over Kocher et al, US Patent Application Publication 2002/0124178, in view of Cordery et al, US Patent 5655023, and with specific reference to independent Claim 26, Appellant generally argues that although Kocher discloses the steps of falsifying and combining as claimed, and Cordery does disclose pre-computation of secret data, the references cannot be combined to result in the claimed invention (see pages 6-19 of the present Appeal Brief).

In particular, Appellant states that the issue in the present case is whether the teachings of Cordery would have led one of ordinary skill in the art to modify Kocher's

method "by replacing contemporaneous auxiliary function value generation with predetermined auxiliary function values and retrieval of the auxiliary values from a memory before beginning data falsification" (Appeal Brief, pages 16-17, emphasis removed). The Examiner agrees that this is the primary issue to be resolved. Although Appellant states that this issue must be answered in the negative, the Examiner respectfully disagrees, and submits that the teachings of Cordery in combination with the method of Kocher would indeed have led one of ordinary skill to use pre-calculated auxiliary values rather than calculating them on the fly, in order to protect the algorithm and secret key used (see Cordery, column 3, lines 11-13, as previously cited).

More specifically, first, Appellant acknowledges that Kocher "discloses computation of an auxiliary function value and combination with output data, as claimed" (Appeal Brief, page 6), and Appellant further states that the difference between the claimed invention and the disclosure of Kocher "lies solely in how the auxiliary function values used to disguise the operations are calculated", where in Kocher, the auxiliary function values are calculated during performance of an encryption algorithm, whereas the claimed invention uses pre-computed function values (Appeal Brief, page 7).

With respect to Cordery, Appellant states that Cordery "is not at all concerned with the problem of power analysis of operations performed on a chip" (Appeal Brief, page 7) and that "Cordery is concerned with keeping secret input data secret by physically protected [sic] the data" (Appeal Brief, page 8). Although Appellant has stated that it is not being argued that Cordery is non-analogous art (Appeal Brief, page 9), the statement that Cordery has nothing to do with power analysis (such as that

described in Kocher or the present application) appears to amount to such an argument. Therefore, the Examiner repeats that, in response to applicant's argument that Cordery is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Cordery is concerned with the encryption and protection of secret data (see, for example, column 3, lines 18-58). This is reasonably pertinent to the problem with which Appellant is concerned, namely the prevention of leakage of secret information (see page 1 of the present specification), and therefore one of ordinary skill in the art would have reasonably looked to Cordery when considering the problem with which Applicant is concerned. See also MPEP § 2141.01(a). "Under the correct analysis, any need or problem known in the field of endeavor at the time of the invention and addressed by the patent [or application at issue] can provide a reason for combining the elements in the manner claimed." *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1397 (2007). Thus a reference in a field different from that of applicant's endeavor may be reasonably pertinent if it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his or her invention as a whole.

Appellant further alleges that "Cordery actually teachings [sic] away from performing operations with secret data in the open" (Appeal Brief, page 8, emphasis removed). However, although Appellant states that Cordery discloses that the device

need not have access to some secret keys (Appeal Brief, page 8, citing Cordery, column 4, lines 54-63), this does not clearly support Appellant's broader conclusion that Cordery teaches away from performing operations "in the open", nor does Appellant clearly describe how performance of operations "in the open" corresponds to what is claimed (nor, for that matter, does Appellant clearly define what is meant by the phrase "in the open", noting that both Kocher and the claimed method involve blinding or otherwise hiding the data and operations to be used). Further, there does not appear to be any disclosure in Kocher or Cordery that constitutes a teaching away from their combination because a teaching away requires the disclosure to "criticize, discredit, or otherwise discourage the solution claimed." *In re Fulton*, 391, F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004). See also MPEP § 2145(X)(D).

Appellant additionally argues that "there is no reason why Cordery would modify the algorithm of Kocher by changing the way in which auxiliary functions are calculated" (Appeal Brief, page 8). However, the teachings of Cordery of pre-computation of secret function values (Cordery, column 3, lines 18-25, where tokens are pre-computed; column 5, lines 10-12, where tokens include encrypted data, as previously cited) are considered to suggest merely changing **when** the auxiliary function values are computed, not **how** they are computed. Appellant also argues that the "auxiliary function values are not the input data that needs to be kept secret", and that if Kocher stored data on a removable token as taught by Cordery, the input data that would be stored would not be the auxiliary function values (Appeal Brief, page 8); however, Appellant has provided no evidence in support of these statements. Appellant argues

that "Cordery's teachings have no applicability to the calculation of auxiliary function values"; however, as broadly interpreted, Cordery is suggestive of pre-computing and storing for later use any number of security-related values (Cordery, column 3, lines 18-25; column 5, lines 10-12; and column 3, lines 11-13; see also column 4, lines 52-59, as previously cited), which are considered to include the auxiliary function values as claimed (and corresponding to the unblinding bits in Kocher, paragraphs 0070, 0072, and 0073).

Appellant further argues that Cordery does not render the claimed invention obvious because Cordery "does not recognize, or have anything to do with, the problem of protecting auxiliary function values" and that Cordery "merely teaches that certain digital tokens with protected data should be generated in a secure environment and stored on a portable device", and Appellant also states that "Cordery is not at all concerned that the otherwise protected input data might be discovered by analyzing power emissions" (Appeal Brief, page 9). The Examiner submits that the second statement is an oversimplification of the teachings of Cordery, and that Cordery more broadly suggests pre-computing and storing for later use various security related values, as noted above (Cordery, column 3, lines 18-25; column 5, lines 10-12; and column 3, lines 11-13; see also column 4, lines 52-59, as previously cited). Further, Cordery is also reasonably pertinent to the problem with which Appellant is concerned, as also detailed above, because Cordery is concerned with the encryption and protection of secret data (see, for example, column 3, lines 18-58).

Appellant also argues that there is no apparent need in any of the references to modify the manner in which Kocher generates auxiliary function values (Appeal Brief, page 9). In response to Appellant's argument that there is no teaching, suggestion, or motivation to combine the references, the examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007). In this case, the motivation to combine the references (by modifying the method of Kocher to include pre-computation and safe storage of secret function values) was to protect the encryption algorithm and secret key used, as taught by Cordery and as described above (see Cordery, column 3, lines 11-13).

Still further, Appellant states that "the sole purpose of the auxiliary function values is to disguise the operations so that they are not revealed by power analysis" (Appeal Brief, page 10); however, this is contrary to both the teachings of Kocher and the claimed invention. Rather, it is the claimed auxiliary data (Z), corresponding to the blinding bits of Kocher, that are used to disguise (or "blind" in Kocher's terminology, or "falsify" as per Claim 26) the data being processed (see also Kocher, paragraphs 0068, 0070, and 0072, as previously cited). The auxiliary function values ($f(Z)$), corresponding to the unblinding bits of Kocher, are used to recover the blinded data (or to

"compensate" for the falsification, in the claimed terms) after certain operations have been performed (see also Kocher, paragraphs 0070, 0072, and 0073). Appellant also states that Cordery could not suggest "pre-performing the disguising operations" (Appeal Brief, page 11); however, the rejection did not suggest that this was the case. Rather, Cordery was relied on for a teaching of pre-computing the auxiliary function values based on the auxiliary data, as claimed (again, see Cordery, column 3, lines 18-25; column 5, lines 10-12; and column 3, lines 11-13; see also column 4, lines 52-59, as previously cited).

Although Appellant asserts that the Examiner's previous responses to the Applicant's arguments stated that the Examiner did not "understand the arguments concerning what is actually taught by the references" and that this allegedly implies that the teachings of the references are irrelevant to whether it would be obvious to combine them (Appeal Brief, page 11), the Examiner notes that the quoted statement from the previous Office action was attempting to explain that the Applicant's arguments were not clearly directed to the analysis or conclusions actually presented in the previous grounds of rejection, and not that the teachings of the references were irrelevant to the determination of obviousness.

Appellant additionally argues that the blinding is only performed after performing an additional permutation and that this is essential to the method of Kocher and cannot be omitted without rendering Kocher's method inoperative (Appeal Brief, pages 12-13). However, there is nothing in Kocher to prevent the blinding data or the permutation data or both from being previously computed. Appellant appears to argue that the

permutation could not be computed beforehand, but there is nothing that explicitly prevents this. Again, Cordery is seen as providing a broad and general teaching that security related computations could be done prior to when they are needed in secure surroundings (Cordery, column 3, lines 18-25; column 5, lines 10-12; and column 3, lines 11-13; see also column 4, lines 52-59, as previously cited); therefore, this would be suggestive of pre-computing any of the needed function values, including, without limitation, the random blinding bit *b* and the random permutation *perm*, as well as the unblinding vector. Appellant states that "Cordery merely teaches that keys **and other secret data** can be stored" (Appeal Brief, page 12, emphasis altered); however, the Examiner submits that not only does Cordery teach storing the keys and other secret data (which one of ordinary skill in the art, considering the method of Kocher, would recognize to include the blinding and/or permutation data), but Cordery also discloses the pre-calculation of such data (again, Cordery, column 3, lines 18-25; column 5, lines 10-12; and column 3, lines 11-13; see also column 4, lines 52-59, as previously cited).

Appellant further argues that "it must be concluded that Kocher specifically requires calculation of the auxiliary function value during data falsification, and that the auxiliary function values cannot be pre-stored and retrieved from a memory in the manner claimed" (Appeal Brief, page 13, emphasis removed). However, while it is acknowledged that the described implementation of the method of Kocher does disclose calculation of an auxiliary value during performance of the algorithm (Kocher, paragraphs 0070, 0072, 0073, as previously cited), there is nothing in Kocher that explicitly prevents such a value from being pre-computed. Kocher further discloses that

“the only security requirement for the process is that the final result be unknown to attackers” (paragraph 0071), that many variations on the described process are possible (paragraph 0075), and additional security methods and countermeasures could also be used to further increase the security of the described processes (paragraph 0081); therefore, it is reasonable to conclude that the specific timing of the calculation of the auxiliary values is not fixed or required by Kocher.

Appellant further details a list of changes that would allegedly need to be made to modify Kocher in order to obtain the claimed invention (Appeal Brief, pages 13-14); however, again, the Examiner notes that these changes all appear to be largely conjecture. Additionally, even assuming *arguendo* that the changes are required, these changes are further suggested by Cordery. Specifically, the broader teachings of Cordery would have suggested to one of ordinary skill that any number of security-related function values, such as the blinding bits and unblinding bits and any other data needed for these calculations such as the permutation could be pre-computed in secure surroundings and stored securely (Cordery, column 3, lines 18-25; column 5, lines 10-12; and column 3, lines 11-13; see also column 4, lines 52-59, as previously cited), in order to protect the encryption algorithm and secret key used (see Cordery, column 3, lines 11-13).

Appellant also again argues that the claimed invention would not have resulted from the changes to Kocher as suggested by Appellant (Appeal Brief, pages 13-14, as noted above) because the blinding step occurs only after permutation and because the permutation serves a specific security purpose (Appeal Brief, pages 14-15). However, it

is noted that Kocher discloses both permuting (with randomized ordering) and blinding the data (Kocher, paragraph 0070-0072, for example) and that data can be maintained in the blinded state during processing, for example, for multiple permutations, until nonlinear operations need to be performed (Kocher, paragraph 0074). That is, Kocher discloses that the blinding can occur before additional permutations (corresponding to the claimed executed operations) take place (Kocher, paragraph 0074).

In response to Appellant's argument that the teachings of Cordery are not accomplished for the purpose of protecting a chip from power analysis (Appeal Brief, page 15), the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Appellant argues that the teachings of Cordery, and specifically "storage of secret keys on a portable device" would not have led one of ordinary skill in the art to modify Kocher's algorithm by pre-calculating the auxiliary function values (Appeal Brief, pages 15-16); however, this oversimplifies the teachings of Cordery. Cordery also discloses pre-computing and storing for later use various security related values, as noted above (Cordery, column 3, lines 18-25; column 5, lines 10-12; and column 3, lines 11-13; see also column 4, lines 52-59, as previously cited). Thus, even though Appellant argues that performing operations or storing secret data on a protected device as taught by Cordery would not solve the problem of power analysis of auxiliary data (Appeal Brief, page 16), the teachings of Cordery of pre-computing the auxiliary function

values (again, Cordery, column 3, lines 18-25; column 5, lines 10-12; and column 3, lines 11-13, as previously cited) combined with the teachings of Kocher (as detailed above) would address the above-noted problem.

Appellant further argues that “Cordery does not teach that there is a risk to generating auxiliary function values” (Appeal Brief, page 17); however, the Examiner fails to appreciate the relevance of this argument. Appellant additionally argues that Kocher is not concerned with the protection of pre-stored data (Appeal Brief, page 17); however, it is noted that Cordery discloses exactly this (again, Cordery, column 3, lines 18-25; column 5, lines 10-12; and column 3, lines 11-13; see also column 4, lines 52-59, as previously cited).

Appellant again acknowledges that Kocher and the present application “are concerned with the discovery of data protection algorithms, and the secret key used therein, by analyzing power emissions” and that Kocher teaches one method that generates auxiliary values during data falsification and the claimed invention predetermines the auxiliary values (Appeal Brief, page 17). Appellant further questions what advantage the modification of Kocher to include pre-calculation of auxiliary values could be recognized to have, asserting that protection against discovery of secret data was “clearly not a problem in the secure system of Cordery” (Appeal Brief, page 18). However, Cordery does indeed recognize the need to protect encryption algorithms and secret keys used therewith (Cordery, column 3, lines 11-13).

Appellant once again argues that Cordery does not use auxiliary function values (Appeal Brief, page 18). In response to Appellant's arguments against the references

individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The Examiner notes that Kocher does disclose the use of auxiliary function values as claimed (Kocher, paragraphs 0070, 0072, and 0073, as previously cited).

Appellant again argues that Cordery teaches storage of sensitive pre-determined data but does not teach replacing a particular item of sensitive data required by Kocher should be replaced by pre-stored data (Appeal Brief, page 18). However, once again, the Examiner notes that the broader teachings of Cordery would have suggested to one of ordinary skill that any number of security-related function values, such as the blinding bits and unblinding bits and any other data needed for these calculations such as the permutation could be pre-computed in secure surroundings and stored securely (Cordery, column 3, lines 18-25; column 5, lines 10-12; and column 3, lines 11-13; see also column 4, lines 52-59, as previously cited), in order to protect the encryption algorithm and secret key used (see Cordery, column 3, lines 11-13). As per MPEP § 2141.03(I), "A person of ordinary skill in the art is also a person of ordinary creativity, not an automaton." *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1397 (2007). "[I]n many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id.* Office personnel may also take into account "the inferences and creative steps that a person of ordinary skill in the art would employ." *Id.* at ___, 82 USPQ2d at 1396. Therefore, the Examiner

submits that one of ordinary skill would have recognized that Cordery is suggestive of pre-computation of any security-related function value, including those taught by Kocher, and thus the combination of Kocher as modified by Cordery would have suggested the claimed invention.

Appellant further argues that the secret data to be protected in Cordery is not stored on the data carrier but rather on a separate secure co-processor (Appeal Brief, pages 18-19, citing Cordery, column 9, line 66-column 10, line 61, and Figure 5). However, Cordery does disclose that secret data is pre-computed and stored on data carriers (see, for example, column 4, lines 52-59, where pre-computed tokens are stored on smart cards, corresponding to the claimed data carrier). Further, the use of the secure co-processor in Cordery corresponds to the previous computation in safe surroundings as claimed (see Cordery, column 9, line 66-column 10, line 61, as cited, where the secure co-processor generates the tokens, and then the pre-computed tokens are transferred for storage to the storage device 104, corresponding to the claimed data carrier). It is noted that "safe surroundings" are not explicitly defined or discussed in detail in the present specification, and therefore, the term has been broadly construed. It is certainly reasonable to conclude that a secure co-processor within tamper-proof surroundings would be considered "safe surroundings" for performing security-related calculations.

Additionally, Appellant again argues that Cordery only teaches pre-computation in the context of a secure co-processor (Appeal Brief, page 19); however, again, it is noted that this appears to correspond to the claimed limitation that the previous

computation of the values is performed in "safe surroundings". Further, as noted above, Cordery is seen to teach, in general, the pre-computation of security-related function values, and in combination with the disclosed steps of Kocher, it is submitted that this would have suggested the claimed invention to one of ordinary skill in the art at the time the invention was made.

Finally, it is generally noted that Appellant provides numerous statements as to whether a combination of references would be inoperable and also submits various other characterizations of the references without providing any evidence in support thereof. The arguments of counsel cannot take the place of evidence in the record. *In re Schulze*, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965). See MPEP § 716.01(c)(II). More specifically, arguments of counsel cannot take the place of factually supported objective evidence. See, e.g., *In re Huang*, 100 F.3d 135, 139-40, 40 USPQ2d 1685, 1689 (Fed. Cir. 1996); *In re De Blauwe*, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1984). See MPEP § 2145. An argument does not replace evidence where evidence is necessary; attorney argument is not evidence unless it is an admission. The arguments of counsel cannot take the place of evidence in the record. *In re Schulze*, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965); *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997) ("An assertion of what seems to follow from common experience is just attorney argument and not the kind of factual evidence that is required to rebut a prima facie case of obviousness."). See MPEP § 2145(I).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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